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NEWSLETTER

JANUARY 1991



Ognen prigor

Bacterievuur

Feu bacterien

Ates yanikligi

Colpo di fuoco

Zaraza ogniowa

Paerebrann	Spala
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Fuego bacteriano

Kherakhon Paronpest

Bakteriozna plamenjaca

Ilidsot Feuerbrand

Vaktiriako kapsimo

Lafha nareya

INTERNATIONAL WORKING GROUP ON FIRE BLIGHT RESEARCH

INTERNATIONAL WORKING GROUP
ON
FIRE BLIGHT RESEARCH

NEWSLETTER

from the

Plant Protection Commission
International Society for Horticultural Science

in cooperation with

U.S. Deciduous Tree Fruit Disease Workers

and

European & Mediterranean Plant Protection Organization

JANUARY 1991

United States Department of Agriculture
Agricultural Research Service

Appalachian Fruit Research Station
Kearneysville, West Virginia, USA

Letter from the Editor

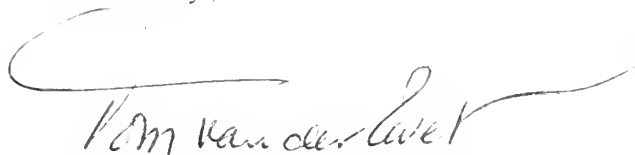
It appears now without any doubt that fire blight is a "disease on the move," especially in the Mediterranean and Balkan areas. Since 1984, one to four new countries have been added to the list annually. During 1990, we received notices that the disease was observed in Armenia, Bulgaria and Yugoslavia, as well as on the southern heel tip of "the boot" of Italy. Thus, it is obvious now that fire blight is spreading faster from the eastern Mediterranean area in a north western direction, than originally from western Europe towards the east and south east.

With Germany being united to one country, the total number of individual countries with fire blight now stands at 27. Since fire blight came ashore (Europe) in the Netherlands in 1966, the disease has been reported from 20 additional countries between western Europe and the Middle East. Thus, it should be a matter of time for fire blight to appear throughout Central Europe and also move into the other republics of the southern USSR.

Starting with this issue of the Newsletter, all German literature will be listed together under the new combined country of Germany. Considering the size of Germany, we will keep two contact persons to cover the news, i.e., Wolfgang Zeller in Dossenheim and Klaus Naumann in Aschersleben.

At this time, I would like to remind all newsletter contact persons to be sure to keep in touch regularly with all personnel in your region, state, province, or country in order to stay abreast of new outbreaks of fire blight, exciting research findings and any other news worthy material for the newsletter. This is the major responsibility of our contact persons.

Sincerely,

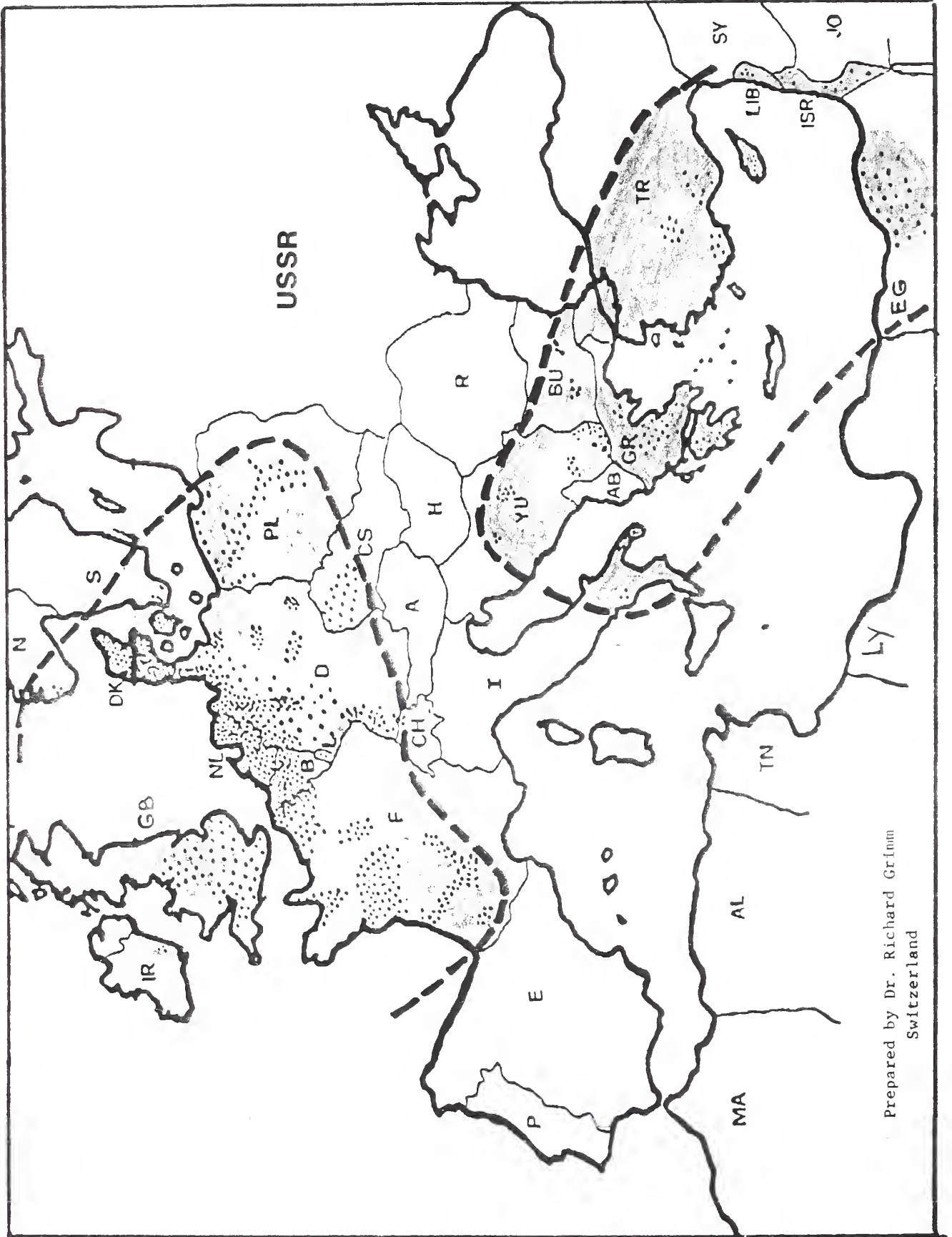


TOM VAN DER ZWET

Secretary,
North American Section
International Working Group
on Fire Blight Research

Present Distribution of Fire Blight in Europe and the Middle East

- 2 -



Prepared by Dr. Richard Grimm
Switzerland

COUNTRIES WITH FIRE BLIGHT

Year	Number	Countries
> 1900	2	USA and Canada
1919	3	New Zealand
1943	4	Mexico
1957	5	England
1962	6	Egypt
1966-70	9	Netherlands, Poland and Denmark
1971-80	12	Belgium, France and Germany
1982	13	Luxemburg
1984	14	Cyprus
1985	16	Israel, Turkey
1986	20	Sweden, Norway, Ireland and Greece
1987	21	Czechoslovakia
1988	22	Lebanon
1989	23	Switzerland
1990	27	Armenia, Bulgaria, Southern Italy, and Yugoslavia

PRESENT STATUS AND NEW OCCURRENCES OF FIRE BLIGHT

CONNECTICUT

No substantial outbreaks of fire blight on apples or pears in Connecticut this year.

Sharon Douglas
New Haven

INDIANA

For the 1990 growing season fire blight was severe in many southern Indiana orchards. This marks the 5th consecutive year fire blight has been of epidemic occurrence in southern Indiana. Orchards with M26 rootstock in combination with susceptible top varieties (Jonathan, Gala, Idared) continue to be devastated by fire blight. Those growers who maintained a tight spray schedule through bloom with streptomycin were able to maintain good control of fire blight.

Paul Pecknold
West Lafayette

ILLINOIS

Very severe shoot blight. Illinois had the fourth wettest year (total precipitation) in history.

Steve Ries
Urbana

SOUTH CAROLINA

1990 was an average fire blight year. We are continuing to plant varieties more susceptible to fire blight than Red Delicious. Our impressions of the Maryblyt program for disease management are favorable after this year. Our acreage is stable to down slightly.

Walker Miller
Clemson

OHIO

1990 was a bad year for blight in all of Ohio except the northern part of the state along Lake Erie. Generally, significant damage only occurred on highly susceptible cultivars.

Note: We had damage from high winds, especially on Golden Delicious just prior to bloom. The wind was so strong it dried the tip of the young branches. Many people thought this was fire blight by mistake.

Mike Ellis
Wooster

UTAH

Fire blight was insignificant in Utah in 1990. Weather conditions were too cold during the bloom period for both pear and apple.

Sherman Thomson
Logan

WASHINGTON

The incidence of fire blight on Washington pear trees was much lower than usual, despite a relatively wet spring. The full bloom period was warm and dry, but our usual infection period of May and June was cool and wet. Similar rainfall in the warmer May and June of 1985 caused a serious blight outbreak.

In late summer, several pear orchards experienced numerous shoot tip infections induced by feeding of Boxelder Bug. Injury by pear psylla did not cause similar shoot tip infection. A new planting of Gala apple had numerous shoot infections, despite a lack of flowers in the block and isolation from an obvious source of inoculum.

Tim Smith
Wenatchee

PENNSYLVANIA

Fire blight on apple occurred widely in Pennsylvania orchards in 1990. It most commonly occurred on late blossoms of 'Rome Beauty' associated with rain periods and temperatures above 60° F. Secondary blighting of vegetative shoots was found infrequently. In one test orchard, lack of aphid control did not result in increased incidence of shoot blight.

Ken Hickey
Biglerville

OREGON

Fire blight was observed in many areas of Oregon during 1990. Home samples of pear, apple, or hawthorn were sent to the Plant Clinic from every region of the State except the coast. This included the Willamette

Valley, Central and South Central Oregon and extreme eastern Oregon. In the commercially important areas:

- Medford (Rogue River) Area - Dr. David Sugar reports that conditions were favorable for severe blight outbreaks. Orchards with poor blight management were hit hard while most orchards experienced only a little fire blight.
- Hood River Valley - Dr. Bob Spotts reports that disease pressure was light during bloom and only a little fire blight developed. Fire blight did show up after some thunder storms in July and some shoot blight occurred near harvest.
- Milton Freewater Area - Only a little fire blight was observed by Tom Darnell, Umatilla County Extension agent, during the 1990 growing season.

Jay Pscheidt
Corvallis

MEXICO

In 1990, fire blight has caused severe damage in the Casas Grandes area, Chihuahua, Mexico on apple varieties such as Strarking, Golden Delicious and other varieties. Percentage Infection ranged from 65-70% on flowers during bloom and 45-55% on foliage. The bacteria are latent in the area and some orchards have been eliminated in this period.

The damage on pear varieties was also elevated and the percentage infection on varieties Golden and Pera Peña has been estimated at 90% during flowering and 75-80% on new foliage.

In 1986, fire blight symptoms were observed in San Cristobal de las Casas in the state of Chiapas, on local varieties of apples. This area is cool, humid and elevated, conditions favorable for disease appearance (information supplied by Carlos Juarez P. and Miguel Santos O., respectively).

Leopold Fucikovsky
Montecillo

SASKATCHEWAN

Again, there were very few fire blight infections seen or reported in this area, despite the increased rain fall in spring.

Rick Sawatzky
Saskatoon

ALBERTA

Central Alberta, Canada (Edmonton Region) fire blight common in 1990; cool wet May, early June (apple bloom, flowering time) a) fire blight abundant on flower (fruit) spurs; b) fire blight common on apple fruit (from spur infection). Apple varieties Goodland and Collet particularly affected. Apple, Crabapple, Mountain Ash, Raspberry - most affected species.

Ieuan Evans
Edmonton

BRITISH COLUMBIA

Weather in British Columbia in 1990 was unusual with a cool and very wet spring and hot August. A record amount of rain fell in June when fire blight generally appears in the Okanagan Valley. However, temperatures were very cool and were not conducive for growth of E. amylovora. Severe infestations of fire blight were rare and reports of the disease were confined to a few orchards where the disease was usually found.

Peter Sholberg
Summerland

ONTARIO

Fire blight of apple and pear did not cause major problems for growers outside the Niagara Peninsula in 1990. There were the usual reportings of fire blight occurring sporadically on shoots and in orchards where the disease has been historically high. In the Niagara region, fire blight remains a concern with the pear growers whose major variety is Bartlett followed by substantial plantings of Bosc. The disease gained a foothold in the area in the mid-eighties following a summer hailstorm. The disease is controlled by pruning out diseased wood, reduced fertilization, streptomycin spraying, and de-suckering of trees. Increased plantings of apples may lead to disease spread to these new plantings which are highly susceptible in their younger years. Fire blight of ornamentals does not appear to be of major concern in Ontario at the moment.

Gordon Bonn
Harrow

TURKEY

This year (1990) in southern Turkey we had moderate to severe fire

blight on pear. I am now working for two years actively on fire blight research and would like to receive the Newsletter continuously.

Timur Momol
Antalya

ENGLAND

The weather at blossom time in 1990, as in several recent years, was unfavorable for fire blight infection as temperatures were too low. In June late blossom on the culinary apple cv. Bramley's Seedlings, produced following frosting of the early blossom, had significant but not serious infection. Fire blight was also noted on shoots and fruitlets of this cultivar. In August there was also significant infection on the dessert apple cv. Egremont Russet. Temperatures at this time were exceptional for the south east being over 30°C.

There was widespread blossom infection on late flowering cider apple cultivars such as Vilberie, Chisel Jersey and Brown Snout in the west of England but no significant infection on perry pears in that region. Brown Snout was also infected in Sussex along with some other late flowering cider apples.

From July to October reports were received by the Ministry of infection on a few pears and apples in Kent and on a range of ornamentals (from 1-10 trees infected in each case) of Cotoneaster horizontalis, C. frigidus, Fructo Luteo, Pyracantha 'Orange Glow', Sorbus aucuparia, S. kiessleri, S. sargentiana from areas as far scattered as Kent, Devon, Oxford and Yorkshire.

Connie Garrett
West Malling

IRELAND

There was a low incidence of fire blight in Ireland during 1990. Outbreaks occurred at three locations in the Dublin area, where the disease was found on Cotoneaster species during the autumn.

Patrick Walsh
Dublin

FRANCE

The fire blight map of France published last year in the Newsletter (from LARUE, 1989) is still valid (except that the distribution of the disease is now more widespread in Normandy and Brittany). The main activity of the disease was seen in May-June. Infections took place on

late blossom of apple (for example on young trees of Elstar, or cider apples). Damages have been extensive in Normandy and Brittany on several local cider apple varieties, which proved to be very susceptible. Some of them have been introduced on the list of plants which are forbidden in France, due to their too high susceptibility to fire blight.

Jean Piere Paulin
Beaucouze

BELGIUM

Large scale primary blossom infections on apple, not only on the pollination varieties James Grieve, Idared and Gloster, but also on our principal variety Jonagold. Young trees with a delay in flowering from ± 5 days were more susceptible than adjacent older trees of the same variety.

Tom Deckers
St. Truiden

DENMARK

No change in status has taken place in Denmark.

G. Dinesen
Lyngby

SWITZERLAND

Since 1989, Switzerland is in the "Club of fire blight". So far, the disease was only found on Cotoneaster salifolius, C. dammeri and Pyracantha; the latter as latent flower infection by monitoring research. There was no fire blight on apples, pears and quinces. The disease was limited in the same region as 1989, near the Bodensee in Northeast Switzerland. The diseased plants were removed. There is no change in the fire blight strategy: no import of host plants except small quarantine imports to get new varieties, rigid field controls, diagnosis and prediction service, monitoring of blooms with symptoms.

Richard Grimm
Wadenswil

NETHERLANDS

In contrast with the years before 1990, last year there was much more fire blight in our country. Especially in the apple orchards, severe

blossom blight was found. Fortunately, we had a dry and warm summer which was giving the fruit growers the opportunity to get ahead of the problem. In pear there were also some more strikes as usual. Outside the orchards mainly hawthorn was infected, but this caused no serious problem for the growers.

Rien van Teylingen
Wageningen

NORWAY

The summer of 1990 does not seem to have been favorable to fire blight in Norway. The disease has not spread outside the district where it was first observed in 1986, and to no new hosts. The eradication program is continuing, and the prospects of its success appear hopeful.

Arild Sletten
AS-NLH

SWEDEN

In Sweden, fire blight spread in two areas. A small area in the fruit growing district north of Simrishamn on the east coast of southern Sweden, and a larger area in the south-west from Ystad to Falkenberg.

In 1990 we had a very early outbreak of fire blight. The first symptoms were observed in pear at the end of May. During the summer there were 79 registered outbreaks (19 in 1989). As in previous years, pear and hawthorn were attacked, but this year we even found the disease in apple, *Sorbus aria* and *Cotoneaster salicifolius*. Most attacks have still been in pear followed by hawthorn. The most heavily infected pear variety is still Herzogin Elsa. Most of the attacks are reported from orchards, but in 5 cases there have been outbreaks in nurseries. In the nurseries there have been just a few infected trees or shrubs.

Magnus Karltorp
Jonkoping

GERMANY

In the northern part of Germany (West) there was a low incidence of fire blight with some attack in hawthorn hedges and in *Cotoneaster* species. In the fruit tree area of the "Altes Land" the disease was found nearly over the whole region. First young trees of 'Jonagold' and 'Elstar' were attacked (blossom infections), later on older apple and pear trees showed shoot infection. A typical fire blight necrosis on more than 100 apples were found at their rootstocks (M9). First attack could be observed on

Sorbus aucuparia and *S. intermedia*. Also in the Nordrhein area a severe outbreak of fire blight was found, especially hawthorn and apple trees besides quinces, *Cotoneaster* species, Sorbus-trees and Stranvesia were attacked. Some apple orchards had to be eradicated. In the south (Rheinland-Pfalz) again a very severe outbreak in early summertime because of hailstorm occurred in the northern part (Grünstadt); 6 orchards were eradicated with the main variety, 'James Grieve'. Also, 'Gloster' and some pears showed shoot infections. *Cotoneaster salicifolius floccosus* was distributed over the whole region. In Baden-Württemberg a late outbreak was found through a hailstorm at the end of June, mainly shoot infections were observed on pome fruit. A first attack on French Perry apples with high losses was found in several orchards near Freiburg (variety 'Avroll').

Wolfgang Zeller
Dossenheim/Heidelberg

Because of the weather conditions in 1990, we had no severe outbreaks of fire blight on pome fruits and ornamental shrubs in eastern Germany.

Helmut Kleinhempel
Aschersleben

GREECE

During 1990, fire blight was found in some new areas, i.e. Karditsa, Kastoria and Ioannina districts. The disease caused some problems on pear orchards. In general the severity of the disease was milder than the previous years. On apple it did not cause serious problems. In some areas (central Greece) severe symptoms of the disease were observed on wild pears (*Pyrus amygdaliformis*). Whole trees were dead because of the disease.

Peter Psallidas
Athens

EGYPT

In the northern region (Behera Governorate) fire blight was serious on pears. Severe losses occurred during bloom to pear trees since the warm wet weather was common in this area. In mid delta (Gharbia, Dakahlia and Kalubia Governorates) the disease was not a problem. Fire blight has not yet been detected on apple in any area in the country.

M.K.El-Kazzaz
Kafr El-Sheikh

CYPRUS

The weather conditions during the 1990 pear bloom (20/3-9/4) were not favourable for fire blight infection. The mean temperature overpassed the Thompson et al. mean temperature predicting line only once at 10-12/4 and after the 20th of April which favored some shoot infection (1-2%).

Blooming of apple (10-30/4) occurred during favourable fire blight infection weather conditions. The susceptible cv. 'Peas Good Non-Such' (known in Cyprus as 'Pera Pedi') suffered serious infections in orchards where no-systematic preventive measures are applied.

Under the provisions of the scheme for replacement of fire blight susceptible pear and apple cultivars, 5115 trees were uprooted and £10,225 were paid to the growers as subsidies for the uprooting.

In addition £2,767 was paid to the growers for purchase of nursery trees for the replacement of the uprooted trees and £7130 for the maintenance of the newly planted orchards.

Maria Dimova-Aziz
Nicosia

CZECHOSLOVAKIA

During 1990, fire blight was found at 63 sites in central and west Bohemia. About 300 diseased trees or bushes were eradicated. The host plants were *Crataegus* (59 sites), *Pyrus*, *Cydonia*, *Cotoneaster* (each 1 site). For the first time fire blight was found on *Sorbus aria* in Czechoslovakia.

Vaclav Kudela
Prague

NEW ZEALAND

Fire blight has not been a problem this season in New Zealand's pipfruit growing regions. The lower than usual rainfall experienced during the most susceptible periods has not been conducive to symptom expression. Detailed inspections of orchards in the "export" regions have failed to report any outbreaks of the disease. Fruit treating on 20,000 individual fruit using a DNA probe has not detected *E. amylovora* in orchards with no visible symptoms of fire blight.

Chris Hale
Auckland

ITALY

Erwinia amylovora was isolated in virtually pure culture on 40% sucrose nutrient agar from active cankers and from washings of symptomless leaves on blighted trees. The bacterium was identified as *E. amylovora* with advice from the Institute of Agricultural and Technical Microbiology in this University and was characterized as follows: short straight asporogenous rod, mostly single, Gram negative, motile with peritrichous flagella. Cultural characteristics as reported in the literature (Billing et al., 1961; Crosse and Goodman, 1973). No visible pigments nor fluorescence produced. Growth proceeds in the presence of 5% NaCl. No growth at 36°C. Optimum temperature 27-28°C. The bacterium is facultatively anaerobic, catalase positive and oxidase negative; no nitrate respiration. Nitrate not reduced to nitrite. Glucose fermented with production of acetoin and no gas. Methyl red negative. Acid produced within 7 d from 1% sucrose, trehalose, mannitol and sorbitol but not from α -methyl-glucoside, arabinose (positive on 9-d-incubation), cellobiose, lactose, maltose, melibiose, melezitose, mannose, raffinose (positive on 9-d-incubation), xylose, adonitol, dulcitol, glycerol, inositol, starch, dextrin, inulin and salicin in 1% peptone water with initial pH 6.8 and bromocresol purple as an indicator. Citrate, fumarate, malate and succinate, but not benzoate, oxalate and propionate used as carbon and energy sources. Reducing substances produced from sucrose. Sodium gluconate not oxidized. No indole from tryptophan nor H₂S from cysteine. Phenylalanine deaminase, urease and Dnase not produced. Gelatin liquefied slowly. Casein not hydrolyzed. Pectate gel not liquefied and potato slices not rotted. The bacterium induces a hypersensitive reaction in tobacco leaves. It causes extensive blackening with a copious milky exudate in pear fruitlets (cv. Conference) and in detached pear shoots (cv. Conference) inoculated by stabbing and incubated in a moist atmosphere for 4 and 6 days, respectively. The identity of three strains of the bacterium was confirmed serologically by Dr. C.M.E. Garrett at East Malling and serologically and by fatty acid profiles by Dr. D.E. Stead at Harpenden.

Corrado Cariddi
Bari

Fire blight was reported in Puglia region (Southern Italy) in early Summer 1990 by Cariddi (Terra e Vita, 34, 67-69). This is the first report of the disease in Italy. Severe attacks were observed in small pear orchards located in some areas of the districts of Lecce and Brindisi. Pear trees were in general 4-7 years old (exceptionally 15-20) and the most heavily infected cultivars were: 'Bella di Giugno', 'William', 'Dr. Guyot' and 'Conference'. All the aerial parts of the trees showed typical disease symptoms. Under high humidity, copious milky exudates were observed with blighted shoots, twigs, blossoms and young fruitlets and with cankers on branches and trunks. In some cases, bark cankers at the crown were also noted.

It was hypothesized that *E. amylovora* might have reached the above mentioned areas by means of high air currents (i.e., from Greece across the Adriatic Sea) or by migratory birds. Notwithstanding the severity of these isolated cases, surveys in other Italian regions confirmed that fire blight is limited to these areas. An eradication program was initiated by the Regional Phytosanitary Authorities, coordinated by the Italian Ministry of Agriculture and Forestry. Hopefully, eradication of the disease will be completed before spring 1991.

Carlo Bazzi
Bologna

BULGARIA

There has been suppositions about the existence of *E. amylovora* in Bulgaria for quite a while. Last year an official investigating committee with a representative of the State quarantine office visited a region where symptoms, bearing a resemblance to the damages of *E. amylovora*, were observed. We unanimously concluded that the observed pear trees bore the traces of fire blight, but as it was late in the summer, we decided to try to isolate and identify the agent in the spring of 1991. I have informed Dr. Grimm (Switzerland) about the regions in our country where I have observed damages on pear trees, resembling fire blight. As far as apples are concerned we have never seen similar symptoms. I hope that this year we will throw some light upon the status of fire blight in Bulgaria.

Rumen Penev
Ploudiv

An investigation on pears and quinces was carried out during the last 2 years and a disease of bacterial nature was established. The symptoms very much resemble those of fire blight and having in mind the gravity of the problem, our efforts were directed towards identifying the pathogens. In our opinion the strains tested belong to *Erwinia amylovora* and here are our arguments for such a conclusion:

All strains investigated have the following characteristics: gram-negative, 1,06-1,69 x 0,62-0,90 m (strain 60A), individual or in pairs, as well as in sort chains, rod shaped, peritrichously flagellated, facultative anaerobs. On King's B medium they don't fluoresce; on YDC they form small, roundish, white colonies; on 5% sucrose medium they produce levan, and on HSM form small craters. Oxidase-negative bacteria, don't degrade L-arginine, induce HR on tobacco leaves; catalase-positive bacteria, don't produce ammonia, H₂S, indole. They utilize glucose, sucrose, arabinose, trehalose, mannitol, sorbitol and liquefy gelatin.

The strains have been tested for pathogenicity by artificial inoculation of vegetative and reproductive parts of stone and pome fruits. With antisera (*E. amylovora*) from Aschersleben they have shown positive reaction by ELISA.

Svetoslav Bobev
Ploudiv

April, 1991

The State Office of Plant Quarantine of the Republic of Bulgaria has confirmed the existence of *E. amylovora* in our country since March of this year. The final conclusion was based on the identification of the bacterium by Mr. Bobev at the University of Agriculture in Plovdiv in cooperation with the Plant Protection Institute at Kostinbrod. Fire blight (*Ognen prigor*) appears localized in the Plovdiv area.

R. Penev
Plovdiv

It appears that fire blight may have been present in Bulgaria since May 1989, first on quince (*Cydonia*) and later on pear and medlar (*Mespilus*). The isolates (mentioned above) sent to me last fall proved to be positive *E. amylovora* through the fatty acid library (T. van der Zwet).

S.G. Bobev
Plovdiv

YUGOSLAVIA

In 1990 the Federal Secretariat of Agriculture organized inspections of apples, pears, and quinces throughout the country in order to conduct a survey for *Erwinia amylovora*. It was found at several locations in the South and South-East along the borders to Bulgaria, Greece, and Albania as well as in two locations in central Yugoslavia. Measures have been taken to destroy the infected trees and plantations.

Fire blight in Yugoslavia was detected on pear at the end of 1989 and the beginning of 1990 in the district of Radovis (*Macedonia*). After first informations about new and until then unknown pear disease in the southeast part of our country (*Macedonia*), all suspicious samples of fire blight host plants were analyzed in both Plant Pathology Departments at the Faculty of Agriculture in Belgrade (Prof. Milan Panic) and in Novia Sad (Prof. Momcilo Arsenijevic), and all localities of fire blight were registered.

Quarantine measures are applied and eradication program has been initiated. Diseased host plants in all districts were eradicated. The orchards with more than 30% of diseased plants were uprooted:

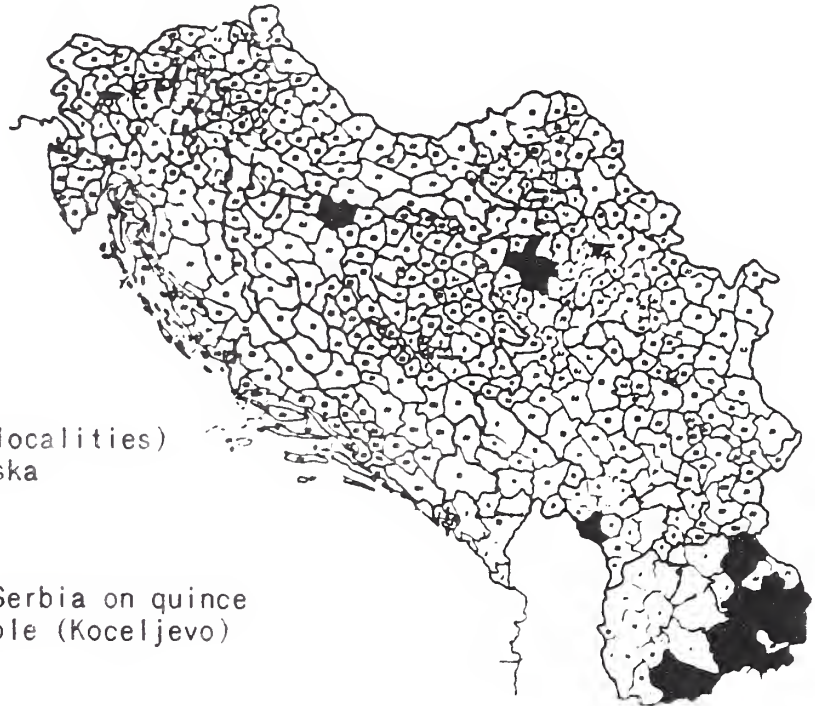
- 26 hectares of pear orchards in the area of Radoviš (*Macedonia*).
- 58 hectares of pear orchards in the area of Bosanška Gradiska (*Bosnia*).
- 28 hectares of pear orchards in the area of Kavadarci (*Macedonia*).
- 1 hectare of quine orchard in the area of Šabac (*Serbia*).

DISTRIBUTION OF FIRE BLIGHT IN YUGOSLAVIA IN 1990:

- In 12 districts in Macedonia on pear, apple and quince (trees) Kriva Palanka, Kratovo, Probistip, Bitola, Kavadarci, Negtinao, Strip, Vinica, Radoviš, Berovo, Strumica, Geveglia).

- In one district (two localities) in Bosnia on pear (Bosanska Gradiška).

- In four districts in Serbia on quince (Vladimirci, Šabac), apple (Koceljevo) and pear (Dakovica).



Till now it was not found on ornamentals (*Pyracantha* and *Cotoneaster*) and *Crataegus*.

Milan Panic
Belgrade

ARMENIAN SSR

A small area of pear orchards (30 ha) along the Araks river, which forms the border between Armenian SSR and Turkey, has been found infested by *Erwinia amylovora* (EPPO A2 list). This isolated outbreak is the first for any part of USSR, and the disease has never been reported in any other Soviet republic. Intensive local measures are being taken.

- Source: Plant Protection Service (USSR).

EPPO
Paris

PORTUGAL

We still have no "Fogo Bacteriano" in Portugal.

Teresa Duarte
Lisbon

As far as known, fire blight is not yet present in Portugal.

J.M.S. Martins
Oeiras

AUSTRIA

No fire blight detected in Austria.

Marianne Keck
Vienna

JAPAN

Fire blight has not been recorded in Japan.

Koji Fujita
Aomori

AUSTRALIA

Fire blight has not been recorded in Australia and stringent quarantine procedures apply on the import of susceptible host material.

David Cartwright
Adelaide

SOUTH AFRICA

Fire blight has not been found in South Africa. Epiphytic populations of *E. amylovora* not yet found in South Africa, but we are still looking at this.

Martin Hattingh
Stellenbosch

MOROCCO

So far, no fire blight has been found in Morocco. But some measures against the disease have been started; limited quarantine measures, field controls, setting up a fire blight laboratory for diagnosis service, etc.

Benzakour Amine Saad
Fes

ALGERIA

This disease has not yet been detected in Algeria.

N. Nassan Agha
EL-Harrach

DETAILS ON CURRENT FIRE BLIGHT RESEARCH REPORTED FROM UNIVERSITIES AND EXPERIMENT STATIONS

FRANCE

We studied the effect of environmental factors on the expression of hybrid *hrp-lac 7* or *dsp-lac 7* products. Both *hrp* and *dsp* genes are induced in minimal medium, mainly with galactose as a carbon source, at low temperature (15°C and 25°C). Neither chlorogenic acid, nor killed apple cells, both known to induce *E. amylovora* virulence, induced the *hrp* and *dsp* genes in any of the studied mutants.

On the other hand, the insertions of the transposon in two non pathogenic mutants, PMV 608 and PMV 6089, do not map in the main *hrp* region previously described (Barney et al., 1990). We are presently studying the possibility that it identifies a novel *hrp* gene region.

J.P. Paulin
Station Phytobact.

NETHERLANDS

The combined research project of the Agric. University and the Plant Protection Service is finished spring 1991. The results are part of the thesis of Henk J. Schouten.

Shortage of personnel caused the liquidation of the Dutch Fire Blight Research Working Group. In the future there will be little possibility for fire blight research in the Netherlands.

M. van Teylingen
Plant Protection Serv.

ENGLAND

Risk assessment. Billing's revised system (BRS)

A detailed account of BRS and its application will be published in the EPPO Bulletin. Meanwhile, current users of BRS should note the following:

1. D-periods are equivalent to 1 (incubation)-periods (they are NOT "infection periods").
2. Infection risk (IR) scores refer to weather-dependent risks on a particular day (assuming the inoculum is present and the targets are susceptible to infection).
3. Incidence of disease. All risks must be taken into account (including inoculum potential, spread risks and target numbers and susceptibility) when assessing this.

Comments and questions from BRS users will be welcomed.

Eve Billing
Horsmonden

GREECE

The current fire blight research projects in Greece are:

1. Screening different epiphytic bacteria for *in vitro* and *in vivo* inhibition of *Erwinia amylovora* in order to find possible candidates for effective biological control (Benaki Phytopath. Inst.).
2. Breeding for fire blight resistance among Greek varieties and selections (Inst. of Deciduous Fruit Trees of Naoussa).
3. Chemical control of *E. amylovora* (Plant Protection Inst. of Volos).
4. Climate and fire blight epidemics. (Benaki Phytopath. Inst.).

P. Psallidas
Benaki Phytopath. Inst.

GERMANY

Current research projects at the Institute of Phytopathology in Aschersleben are:

- Further investigations on methods of warning and forecasting.
- Evaluation of pear, apple and ornamental varieties for resistance to fire blight.
- Investigation of fire blight epidemiology and pathogenicity.
- Continuation of control trials in pear, apple and ornamental shrubs.

H. Kleinhempel
Institute of Phytopath.

ITALY

Disease management strategies are based on:

- a) Sanitation operations to eliminate infected trees;
- b) Phytosanitary program at the national and/or regional levels (Regional Decree: Regione Puglia, Bollettino Ufficiale, Anno XXI, Bari, 27 dicembre 1990. No. 220). A new Ministerial Decree will also regulate pear growing, production and commerce in the Puglia region;
- c) Phytosanitary checks and analyses on imported host plants;
- d) Phytosanitary inspections in nurseries and orchards.

Studies for the characterization of *E. amylovora* strains and for a better understanding of some epidemiological aspects of the disease in Puglia region, will be carried out by the Dipartimento per la Protezione delle Piante dalle Malattie, University of Bari.

Genetic studies for the selection of seedlings, hybrids and varieties with good and stable fire blight resistance are still under way at the Istituto Sperimentale per la Frutticoltura di Roma (EEC Fire Blight Working Group).

C. Bazzi
Istituto Patol. Vegetale

AUSTRIA

In collaboration with J. P. Paulin, INRA Research Station Angers, France: Thermotherapy of Erwinia amylovora infections.

M. Keck
*Bundesanstalt für
Pflanzenschutz*

ONTARIO

'HARROW SWEET' - A new fire blight resistant pear, 'Harrow Sweet' is the first introduction from the Harrow pear breeding program to be subject to Canadian Plant Breeders legislation and a contract has been signed for its commercial exploitation in Europe. 'Harrow Sweet' (HW 609), is hardy, consistently productive, and trees come into production in the second or third year after planting. The medium to large fruit, which ripen about 25 days after 'Bartlett', are very sweet and juicy with excellent taste, and keep well in cold storage.

In order to demonstrate that fire blight resistant pear cultivars can be grown under conditions which induce early fruit production and maximize yield and marketability of the crop, an experiment has been initiated to measure growth, fire blight susceptibility and yield of 'Harrow Delight', 'Harrow Sweet' and HW-614 in an intensively managed orchard where water and nutrient availability are controlled.

G. Bonn
Agriculture Canada

AUSTRALIA

Greetings from "Down Under".

January, 1991

We are currently in the midst of a heat wave (100°F plus) in Adelaide and so far this spring and summer it has been the hottest for many years. I hope that your winter in West Virginia is bearable.

The Australian Quarantine and Inspection Service (AQIS) has been undertaking an exhaustive investigation on the risk of introducing fire blight on apple fruit from New Zealand. As New Zealand has fire blight, a range of stringent procedures were proposed, including the identification of low risk areas based on weather data, orchard inspections immature fruit sampling and testing using a cDNA probe to Erwinia amylovora, etc. There has been a very vigorous debate throughout industry and government on the risks posed to our apple and pear orchards by such imports.

It was recently (29 November 1990) announced by the Commonwealth Minister for Resources that the protocol had been rejected on the basis of "deficiencies in scientific data for area freedom from the disease, the reliability of orchard surveys and the efficacy of a dip treatment against bacteria in the fruit calyx."

This is by no means the end of the issue and the AQS assessment will be reviewed by both the New Zealand authorities and the local industry bodies.

The risk of fire blight entering the country on fruit was highlighted in 1990 by the detection by Dr. Peter Fahy, Department of Agriculture, New South Wales, of suspected bacteria from fruit of New Zealand Nashi pear that was seized on its arrival in Australia. Dr. Fahy's initial testing in Australia and subsequent comparative testing in New Zealand showed that the bacteria were indistinguishable from "typical" *Erwinia amylovora* cultures but there is controversy on whether it was fire blight.

The AQIS would be very grateful for any information concerning techniques to eliminate *E. amylovora* bacteria from propagation material. The paper of Keck et al., (Acta Hort. 273, 1990) is promising, however, considerably more work is obviously required to determine the suitability and reliability of the technique. I suspect, as with other heat treatments, eg. hot water treatment for Pierce's Disease elimination, that both temperature and time will be critical not only for elimination of the bacteria but also survival of the budwood.

D. Cartwright
Dept. of Agriculture

OREGON

Dr. David Sugar tested 40 isolates in the Medford area for streptomycin resistance but did not detect any.

Several other research projects have been initiated by the faculty of the Botany and Plant Pathology Department. These projects are focused on investigating the biology of potential *E. amylovora* antagonists in commercial pear orchards. There has also been some research focused on the validation of forecasting models in certain production areas.

J.W. Pscheidt
Oregon State University

EPPO Reporting Service:

Techniques for rapid detection and diagnosis of plant disease

A BSPP/BCPC Conference held at Norwich (GB) heard of several techniques of interest to EPPO:

- 1) P.R. Mills (Dept. Plant Pathology, Queen's University of Belfast) reported on uses of nucleic acid probes for identification of Erwinia amylovora (A2 List);

EPPO
Paris

MISCELLANEOUS NEWS

Mr. Nassan Agha traveled to Angers, France to work for two weeks with Dr. J. P. Paulin.

Dr. R. N. Goodman will spend several months (starting 14 Feb.) at the Federal Research Station in Wädenswil, Switzerland.

M.N. Brissett spent six months (Sept. 1990) as a post-doc in Tom Burr's lab., Geneva Expt. Station. Cornell University, NY (A. tumefaciens on grapes).

R. Wodzinski, Ithaca College arrived in January at Station de Pathologie Végétale - INRA-Angers, for a sabbatical (E. herbicola/antagonism).

Due to the small size of the fruit growing industry in Saskatchewan and the relative infrequency of fire blight problems, no research on fire blight is being done or anticipated in the near future (Sawatzky).

Dr. Peter Mills from Queens University, Belfast Northern Ireland visited Chris Hale and Rosemary Clark at DSIR Plant Protection, 13-18 May 1990, to discuss DNA hybridisation technology.

Dr. Peter Fahy, from the Biological and Chemical Research Institute, Rydalmere, New South Wales, Australia, spent two weeks with Chris Hale and Rosemary Clark using DNA hybridisation technology to identify Erwinia species.

Dr. P.G. Psallidas attended the 8th Congress of the Mediterranean Phytopathological Union in Agadir (Morocco) from October 28 to November 3, 1990, to present a paper on the situation of fire blight in Greece.

A one day Fire Blight Workshop was held on September 26, at Bath University, organized by Richard Cooper. About 25 people from the U.K.

heard papers on somaclonal variation and disease resistance in apple (A. Donovan and C. Garrett), structural aspects of the surface of *E. amylovora* (A. Smith), biological control in pear orchards (S. Nicholson, H. Epton and D. Sigee), perspectives on pathogenicity (R. M. Cooper), fatty acid profiling for rapid identification of *E. amylovora* (D. Stead), molecular approaches to pathogenesis (J. Mansfield), use of Tn5phoA to study regulation of gene expression in *E. amylovora* (J. Miller), capsule gene expression (M. Coleman) and an update of Eve Billing's work during her so called "retirement".

Tim Smith traveled to Chihuahua Mexico to speak to the Mexican National Apple Producers Annual Meeting, about fire blight and its control. Conditions for fire blight infection are so favorable that even Red Delicious apples have been seriously damaged in Spring 1988.

Pascal Lecomte (INRA-Dax) will leave DAX to join the Angers fire blight team by the end of 1991. This is in relation with the progressive ending of experimental activities in the experimental orchard of DAX (ex-subsidized by CEE).

Mr. Saad Benzakout Amine, bacteriologist in the "Inspection Régionale de la Protection des Végétaux de Fés" had a stay of two weeks in the laboratory of R. Grimm in Wädenswil, Switzerland.

To contact Dr. Eve Billing:

Answering machine: I now have an answering facility on my phone which allows you to leave a message up to three minutes long. Please tell me the day and time most convenient for returning your call.

FAX: A local grocer and wine merchant (two miles from here) can send and receive FAX messages for me on weekdays between 08:30 and 17:30 (GMT or BST). He closes at 13:00 on Wednesdays and Saturdays. The FAX number for the Brenchley Wine Co. is 089-272-3248.

Dr. Philippe Maertens will leave the research group of our Branch Station in St. Truiden, Belgium on January 15th.

Dr. Paulin (Angers) visited the Institute for Phytopathology in Aschersleben in October 1990.

In August 1990, Dr. Zeller made visits to Dr. van der Zwet (USDA-ARS, Appalachian Fruit Research Station, West Virginia, USA), Dr. Aldwinckle (NY State Agr. Expt. Station, Geneva, New York, USA), Dr. Beer (Cornell University, Ithaca) and Dr. Bonn (Agriculture Canada, Harrow, Ontario).

A one day workshop on DNA and Fatty Acid Fingerprinting of Bacteria is to be given by Dr. Mike Gillings and Dr. Peter Fahy during the 8th Australian Plant Pathology Society Conference in Sydney, Australia, October 7-11, 1991 (see future meetings).

New appointment at Ministry of Agriculture and Fisheries, Province of British Columbia; Gale D. Jespersen, M. Sc., P. Ag., Plant Pathologist, 1873 Spall Road, Kelowna, British Columbia, Canada V1Y 4R2 (replacement for Dr. Yorston who was killed in a car accident last year).

Our long standing coworker, Dr. Werner Ficke died at Aschersleben on September 21, 1989.

Dr. Ron Covey, Wenatchee, Washington, passed away in 1990.

In October, 1990, the news reached us that Dr. Don Egolf, National Arboretum, Washington, D.C., died in a car accident.

LOCATIONS REPORTING AVAILABILITY OF *E. AMYLOVORA* CULTURES FOR EXCHANGE PURPOSES

Plant Protection Service
Department of Bacteriology
P.O. Box 9102
6700 HC Wageningen
The Netherlands

Laboratory of Bacteriology
Benaki Phytopathological Institute
8 Delta Street, GR 145 61 Kifissia
Athens, Greece

Greek isolates of *Erwinia amylovora*

INRA-Angers (CFBP) (Curator: L. Gardan)
All published strains are available from J. Laurent.

Dipartimento di Protezione delle
Piante dalle Malattie
Università degli Studi di Bari
Via G. Amendola 165/A
70126 Bari (Italy)
TEL: 080-242911
FAX: 080-242813

Agriculture Canada, Research Station
Harrow, Ontario, Canada NOR 1G0

International Collection of Microorganisms from Plants
Curator - Dr. J. M. Young
DSIR Plant Protection
Private Bag, Arckland, New Zealand.

NEW THESES AND DISSERTATIONS

<u>NAME</u>	<u>Theses and Dissertations</u>	<u>University</u>	<u>Degree</u>	<u>Year</u>
Nouara, A.	Studies of fire blight on pear in Algeria	Inst. Natl. Agronomique	Diplome Ingenieur	1990
Brisset, M.N.	Recherche et mise au point de modèles de laboratoire adaptés à l'étude de l'interaction <u>Erwinia amylovora</u> Pomoïdeae	INA-Paris	Ph D	1990
Delobelle, F.	Mise en évidence de modifications de perméabilité cellulaire liées à l'interaction <u>Erwinia amylovora</u> Pomoïdeae	Nantes	DEA	1990
Barney, M.A.	Etude génétique et moléculaire du déterminisme du pouvoir pathogène d' <u>Erwinia amylovora</u> . agent du feu bactérien des Pomoïdees	Paris VII	Ph D	1990
Timmermans, Y.	Warning systems on fire blight	Louvain-la-Neuve	Ph D	1991
Argyropoulou, A.	Studies on the characteristics of Greek isolates of <u>Erwinia amylovora</u>	Agric. Athens	M. Sc.	1990

FUTURE MEETINGS

1991

June 13-14

National Meeting: A workshop on fire blight is planned at the Biologische Bundesanstalt in Dossenheim, Germany. Visitors or colleagues from other European stations are cordially invited. Organizer, Dr. W. Zeller, Biologische Bundesanstalt, 6915 Dossenheim, Germany.

August 18-22

The Annual Meeting of the American Phytopathological Society will be held in St. Louis Missouri.

October 7-11

The 8th Australian Plant Pathology Society Conference is to be held in Sydney, Australia. For further information contact:

8APPSC
Biological Chemical Res. Inst.
PMB 10
Rydalmere 2116
NSW, Australia

1992

1992

**SIXTH
International Workshop
on
Fire Blight**

(between October 1-15)

Athens, Greece

FIRE BLIGHT LITERATURE RECEIVED DURING 1989-90

(Not listed in USDA Agriculture Handbook 510,
the Additional Bibliography or Previous Newsletters)

UNITED STATES

BACTERIOLOGY

- III - 289 van der Zwet, T. and J.C. Walter. 1990. Antagonism of lactic acid bacteria against Erwinia amylovora. Phytopathology 80:673.
- III - 290 Mendoza, A. and A.K. Chatterjee. 1990. Molecular cloning of an Erwinia amylovora RC-B gene required in polysaccharide synthesis. Phytopathology 80:982.
- III - 291 Beer, S.V., R.J. Laby and D.L. Coplin. 1990. Complementation of HRP Mutants of Erwinia amylovora with DNA of Erwinia Stewartii. Phytopathology 80:985.
- III - 292 Sneath, B.J., J.M. Howson, and S.V. Beer. 1990. A pathogenicity gene from Erwinia amylovora encodes a predicted protein product homologous to a family of procaryotic response regulators. Phytopathology 80:1038.
- III - 293 Laby, R.J., S.V. Beer. 1990. The HRP gene cluster of Erwinia amylovora shares DNA homology with other bacteria. Phytopathology 80:1038-1039.
- III - 294 Wei, Z.M. and S.V. Beer. 1990. Functional homology between a locus of escherichia-coli and the HRP gene cluster of Erwinia amylovora. Phytopathology 80:1039.
- III - 295 Steinberger, E.M., G.Y. Cheng, and S.V. Beer. 1990. Characterization of A 56-KB plasmid of Erwinia amylovora EA322 and its noninvolvement in pathogenicity. Plasmid 24:12-24.
- III - 296 Chatterjee, A., W. Chun, A.K. Chatterjee. 1990. Isolation and characterization of an RCSA-like gene of Erwinia amylovora that activates extracellular polysaccharide production in Erwinia spp., Escherichia coli and Salmonella typhimurium.
- III - 297 Coplin, D.L. and D. Cook. 1990. Molecular genetics of extracellular polysaccharide biosynthesis in vascular

phytopathogenic bacteria. *Molecular Plant-Microbe Interactions* 3:271-279.

- III - 298 Bernhard, F., K. Poetter, K. Geider, and D.L. Coplin. 1990. The RCSA gene from *Erwinia amylovora* identification nucleotide sequence and regulation of exopolysaccharide biosynthesis. *Molecular Plant-Microbe Interact* 3:429-437.
- III - 299 Collmer, A. 1990. Molecular biology of pathogenicity in the genus *Erwinia*: An overview. *Proc. 7th Inter. Conf. Plant. Path. Bact.*, Abstracts, p. 183.
- III - 300 Wodzinski, R.S., M.B. Mudgett, and S.V. Beer. 1990. Mechanism by which the antibiotic of *Erwinia herbicola* Eh318 inhibits *Erwinia amylovora* Ea273. *Proc. 7th Inter. Conf. Plant Path. Bact.*, Part A:265-266.
- III - 301 Vanneste, J.L., L.B. Smart, C.H. Zumoff, J. Yu, and S.V. Beer. 1990. Role of antibiotic production by *Erwinia herbicola* EH252 in reducing the incidence of fire blight. *Proc. 7th Inter. Conf. Plant Path. Bact.* Part A:443-446.
- III - 302 van der Zwet, T. and J.M. Wells. 1990. Nature and variation of fatty acid classes of numerous strains of *Erwinia amylovora*. *Proc. 7th Inter. Conf. Plant Path. Bact.*, Part 1:649-652.
- III - 303 Beer, S.V., C.H. Zumoff, D.W. Bauer, B.J. Sneath, and R.J. Laby. 1990. Elicitation of the hypersensitive response by *Escherichia coli* containing a cluster of pathogenicity genes from *Erwinia amylovora*. *Proc. 7th Intern. Conf. Plant Path. Bact.*, Part B: 675-678.
- III - 304 Goodman, R.N., W. Chun, and G. Feistner. 1990. Bioassay for necrogenic response of DHP and virulence of *Erwinia amylovora*. *Acta. Hort.* 273:221-225.
- III - 305 Norelli, J.L., M.T. Gilbert, H.S. Aldwinckle, C.H. Zumoff, and S.V. Beer. 1990. Population dynamics of nonpathogenic mutants of *Erwinia amylovora* in apple host tissue. *Acta. Hort.* 273:239-240.
- III - 306 Beer, S.V., C.H. Zumoff, D.W. Bauer, B.J. Sneath, and R.J. Laby. 1990. A cluster of pathogenicity genes from *Erwinia amylovora* enables *Escherichia coli* to elicit the hypersensitive response. *Acta. Hort.* 273:241.

- III - 307 Sneath, B.J., J.M. Howson and S.V. Beer. 1990. Siderophore genes of Erwinia amylovora: cloning and putative role in virulence. Acta. Hort. 273:255-257.
- III - 308 Wodzinski, R.S., M.B. Mudgett, and S.V. Beer. 1990. Mechanism by which the antibiotic of Erwinia herbicola Eh318 inhibits Erwinia amylovora Ea273. Acta. Hort. 273:390.
- III - 309 Vanneste, J.L., L.B. Smart, C.H. Zumoff, J. Yu, and S.V. Beer. 1990. Control of fire blight by Erwinia herbicola EH252: Role of antibiotic production. Acta. Hort. 273:393-394.
- III - 310 Wodzinski, R.S., S.V. Beer, C.H. Zumoff, J.C. Clardy, and S.J. Coval. 1990. Antibiotics produced by strains of Erwinia herbicola that are highly effective in suppressing fire blight. Acta. Hort. 273:411-412.

ETIOLOGY

- IV - 124 van der Zwet, T., S.V. Thomson, R.P. Covey, and W.G. Bonn. 1990. Population of Erwinia Amylovora on external and internal apple fruit tissues. Plant Disease 74:711-716.
- IV - 125 Thomson, S.V. 1990. Dispersal of antibiotic marked Erwinia amylovora from inoculated flowers. Proc. 7th Intern. Conf. Plant Path. Bact., Abstracts, p. 75.
- IV - 126 van der Zwet, T. 1990. Determination of earliest blossom blight symptoms on Malus and Pyrus following in situ inoculation with various inoculum levels of Erwinia amylovora. Proc. 7th Intern. Conf. Plant Path. Bact., Part A:277-283.

ENTOMOLOGY

- V - 43 Thomson, S.V., M.K. Shotwell, and J.D. Vandenberg. 1990. The distribution of antagonistic bacteria by honey bees for biological control of fire blight. Phytopathology 80:1017.
- V - 44 Clark, G.G., K.D. Hickey, and J.W. Travis. 1991. Fire blight management: Evaluation of the role of aphids in transmission of bacteria and development of a computerized management system for growers. PA Fruit News 71:43-44.

EPIDEMIOLOGY

- VI - 83 Thomson, S.V. 1989. Understanding fire blight - Prediction and control. Ann. Rept. Mich. State Hortic. Soc. 119:54-59.
- VI - 84 Thomson, S.V. 1990. Forecasting fire blight. Utah Science 51:75.
- VI - 85 Steiner, P.W. 1990. Fire blight and its control. Mass. Fruit Growers Asso. Ann. Mtg. 96:39-43.
- VI - 86 Steiner, P.W. 1990. Predicting apple blossom infections by Erwinia amylovora using the maryblyt model. Acta. Hort. 273:139-148.
- VI - 87 Steiner, P.W. 1990. Predicting canker, shoot and trauma blight phases of fire blight epidemics using the maryblyt model. Acta. Hort. 273:149-158.
- VI - 88 Lightner, G. and P.W. Steiner. 1990. Computerization of blossom blight prediction model. Acta. Hort. 273:159-162.
- VI - 89 van der Zwet, T., G. Lightner, J.C. Walter, and P.W. Steiner. 1990. Comparison of the Maryblyt predictive model with the Billing revised system for blossom blight risk assessment in apple. Acta. Hort. 273:171-183.

BIOCHEMISTRY

- VII - 54 Suleman, P. and P.W. Steiner. 1990. The effect of photosynthates on the susceptibility of apple shoots to fire blight. Phytopathology 80:673.
- VII - 55 Zaccheo, A. 1990. Growth of Erwinia amylovora on extracts of susceptible rosaceae. Acta. Hort. 273:339-341.

CHEMICAL CONTROL

- IX - 295 Smith, T.J. 1989. Frontiers in fire blight management. Wash. State Hort. Asso. Proc. 85:198-204.
- IX - 296 Aldwinckle, H.S. and J.L. Norelli. 1990. Evaluation of Kasumin for control of fire blight. Acta. Hort. 273:391.

- IX - 297 Loper, J.E. and M.D. Henkels. 1991. Evaluation of streptomycin, oxytetracycline, and copper resistance of *Erwinia amylovora* isolated from pear orchards in Washington State. Plant Disease 75:287-290.

ERADICATION

- X - 47 Covey, R.P. and W.R. Fisher. 1990. Timely cutting of fire blight infections reduces losses. Acta. Hort. 273:351-353.

HOST RESISTANCE

- XI - 346 Egolf, D.R. 1986. 'Naragansett' crabapple. HortScience 21:1462-1463.
- XI - 347 van der Zwet, T., and R.L. Bell. 1990. Fire blight susceptibility in *Pyrus* germplasm from eastern Europe. HortScience 25:566-568.
- XI - 348 Hummer, K. 1990. The status of *Pyrus* germplasm in the USA. HortScience 25:1142.
- XI - 349 Ryugo, K., I. Okuse, and Y. Fujii. 1990. Correlation between fire blight resistance and phenolic levels in pears. Acta. Hort. 273:335-338.
- XI - 350 Bell, R.L., T. van der Zwet, W.G. Bonn, B. Thibault, and P. Lecomte. 1990. Environmental and strain effects on screening for fire blight resistance. Acta Hort. 273:343-350.
- XI - 351 Walsh, C.S. 1990. Asian pear culture. Mass. Fruit Grower Assoc. Ann. Mtg. 96:127-129.
- XI - 352 Way, R.D., K.G. Livermore, and R.C. Lamb. 1990. 'Empress' Apple. HortScience 25:987-988.
- XI - 353 Granger, R.L. and C.N. Fortin. 1990. 'Richelieu' apple. HortScience 25:1310-1311.
- XI - 354 Sutton, T.B. and L.R. Pope. 1990. The susceptibility of scab immune cultivars and selections of apple to fire blight and cedar apple rust, 1989. Amer. Phytopath. Soc. Biol. and Cult. Tests. Vol. 5:4.
- XI - 355 Hartman, J.R. and B.S. Kennedy. 1990. Reactions of flowering crab apple cultivars to foliar diseases, 1989. Amer. Phytopath. Soc. Biol. and Cult. Tests Vol. 5:91.

EXTENSION LEAFLETS

- EL - 86 Boone, D.M. and E.K. Wade. 1986. Apple (*Malus spp.*), pear (*Pyrus spp.*) and other trees -- Disorder: fire blight. Wisc. Coop. Ext. Serv. Leaflet A1616, 3 pp.
- EL - 87 Heimann, M.F. and S.N. Jeffers. 1990. Raspberry disorder: fire blight. Wisc. Coop. Ext. Serv. Leaflet A3499, 2 pp.
- EL - 88 Hagan, A. and W. Gazaway. 1990. Fire blight on fruit trees and woody ornamentals. Alabama Coop. Ext. Serv. Cir. 542, 4 pp.

CANADA

- XII - A - 118 Bonn, W.G. and J. Warner. 1989. Response of apple cultivars and rootstocks to fire blight, 1988. Amer. Phytopath. Soc., Biol and Cult. Test Vol. 4:6.
- XII - A - 119 Bonn, W.G. and D.C. Elfing. 1989. Response of crabapple cultivars to fire blight, 1988. Amer. Phytopath. Soc., Biol. and Cult. Tests Vol. 4:81.
- XII - A - 120 Bonn, W.G. and J. Warner. 1990. Response of apple cultivars and root stocks to fire blight, 1989. Amer. Phytopath. Soc., Biol. and Cult. Test Vol. 5:3.
- XII - A - 121 Bonn, W.G. and D.C. Elfing. 1990. Response of crabapple cultivars to fire blight, 1989. Amer. Phytopath. Soc., Biol. and Cult. Test Vol. 5:92.
- XII - A - 122 Quamme, H.A., F. Kappel, J.W. Hall. 1990. Efficacy of early selection for fire blight resistance and the analysis of combining ability for fire blight resistance in several pear progenies. Can. J. Plant Sci. 70:905-904.
- XII - A - 123 Bonn, W.G. and D.C. Elfving. 1990. Evaluation of crabapple cultivars and selections for resistance to fire blight. Acta Hort. 273:311-317.

NEW ZEALAND

- XII - B - 38 Hale, C.N. and C.G. Rosemany. 1990. Detection of *Erwinia amylovora* from apple tissue by DNA hybridisation. Acta Hort. 273:51-55.

- XII - B - 39 Kearns, L., H.K. Mahanty, and C.N. Hale. 1990. Molecular analysis of mode of inhibition of *Erwinia amylovora* by *Erwinia herbicola*. Proc. N.Z. Genet. Soc., Molec. Genet. Symp., Abstr. 67.
- XII - B - 40 Clark, R., P. Guilford, C. Hale, and R. Forester. 1990. Sensitive and specific detection of plant pathogenic bacteria directly from plant tissue by DNA hybridisation. Proc. N.Z. Genet. Soc., Molec. Genet. Symp., Abstr. 61.
- XII - B - 41 White, A.G., D. Cranwell, B. Drewitt, C. Hale, N. Lallu, K. Marsh, and J. Walker. 1990. Asian pear in New Zealand. Fire Blight, pp. 51-52. In: "Nashi-Asian pear in New Zealand, (A.G. White et al., eds.), Dept. Scient. and Industr. Res. Publ., Wellington, N.Z.

AUSTRALIA

- XII - C - 10 Wimalajeewa, S.C. and K. Atley. 1990. The potential vulnerability to fire blight of pear and apple crops in the Goulburn Valley, Victoria, Australia. Acta Hort. 273:67-72.

NETHERLANDS

- XII - F - 116 Kooistra, T. 1989. Bacterial diseases: Integrated control of the past. Gewasbescherming 20:124-130.
- XII - F - 117 Van Tooren, B. 1990. The hawthorn not responsible for fire blast in orchards. Levende Nat. 91:98-99.
- XII - F - 118 Schouten, H.J and M. van Teylingen. 1990. Bloei van wilde meidoorn en het optreden van bacterievuur in peer. Gewasbescherming 21:8.
- XII - F - 119 Teylingen, M. van. 1990. Bloei van wilde meidoorn en bacterievuur; zin en onzin van de MOP. Ned. Bosbouw Tijdsch. 62:257-26.
- XII - F - 120 Bouma, A.S. 1990. Nog lang zoeken naar goede bacterievuur resistente rassen. Fruitteelt 8:38-29.
- XII - F - 121 Bouma, A.S. 1990. Bacterievuur snel onderkennen voorlopig enige oplossing. De Boomwekerij 10 (March):12-14.

- XII - F - 122 Bouma, A.S. 1990. Veredeling wellicht uitkomst voor bacterievuur. De Boomkwekerij 11:20-21.
- XII - F - 123 Schouten, H.J. and M.van Teylingen. 1990. Onderzoek naar invloed van bloei van wilde meidoorn op bacterievuur in pereboomgaarden. Rap. Vakgroep Fytopath. Landbouwniv. Wageningen & Plantenz. Dienst, Wageningen, 16 pp.
- XII - F - 124 Coster, C. and J. Waalkens. 1990. Kasumin, a bactericide against fire blight in ornamental nursery crops. Proc. 7th Intern. Conf. Plant Path. Bact., Part A:243-245.
- XII - F - 125 Schouten, H.J. 1990. Mechanical pressure of *Erwinia amylovora* in relation to water potential and its possible role in pathogenesis. Acta. Hort. 273:195-196.
- XII - F - 126 Bouma, A.S. 1990. Breeding pyracantha for fire blight resistance. Acta. Hort. 273:327-334.

ENGLAND

- XII - G - 143 Billing, E. and J.P. Paulin. 1990. The development of fire blight risk assessment approaches in Europe. Pp 20-23 In "Fire Blight of Pomoideae;" Applied Research in Europe (EUR 12601), Comm. Europ. Commun.
- XII - G - 144 Billing, E. and J.P. Paulin. 1990. Field observations and epidemiological studies in relation to risk assessment. Pp 34-37 In "Fire Blight of Pomoideae;" Applied Research in Europe (EUR 12601), Comm. Europ. Commun.
- XII - G - 144a Garrett, C.M.E. 1990. Control of fire blight. Pp 54-78 In "Fire Blight of Pomoideae;" Applied Research in Europe (EUR 12601), Comm. Europ. Commun.
- XII - G - 145 Blakeman, J.P. 1990. Foliar bacterial pathogens epiphytic growth and interactions on leaves. J. Appl. Bacter. 69:IV-V.
- XII - G - 146 Coleman, M., R. Pearce, E. Hitchin, F. Busfield, J.W. Mansfield, and I.S. Roberts. 1990. Molecular cloning expression and nucleotide sequence of the RCS-A gene of *Erwinia amylovora*. J. Gen. Microbiol. 136:1799-1806.

- XII - G - 147 Wilson, M., H.A.S. Epton, and D.C. Sigee. 1990. Biological control of fire blight of Hawthorn *crataegus-monogyna* with *Erwinia herbicola* under protected conditions. *Plant Path.* 39:310-308.
- XII - G - 148 Walters, K., A. Maroofi, E. Hitchin, and J. Mansfield. 1990. Gene for pathogenicity and ability to cause the hypersensitive reaction cloned from *Erwinia amylovora*. *Physiol. Mol. Plant Path.* 36:509-522.
- XII - G - 149 Walters, K., A. Maroofi, F.E. Hitchin, and J.W. Mansfield. 1990. Determinant of pathogenicity to pears and ability to cause the HR in non-host plants cloned from *Erwinia amylovora*. *Proc. 7th Intern. Conf. Plant Path. Bact.*, Abstracts, p. 128.
- XII - G - 150 Billing, E. 1990. Disease risk assessment. Changes to Billing's system for fire blight risk assessment. *Proc. 7th Intern. Conf. Plant Path. Bact.*, Part A:231-236.
- XII - G - 151 Billing, E. 1990. Some unanswered questions in fire blight research. *Acta Hort.* 271:99-105.
- XII - G - 152 Billing, E. 1990. Fire Blight concepts and revised approach to risk assessment. *Acta Hort.* 273:163-170.
- XII - G - 153 Garrett, C.M.E. and D.A. Fletcher. 1990. Microprocessor-based orchard environment monitors and fire blight risk assessment. *Acta Hort.* 273:185-187.
- XII - G - 154 Wilson, M., H.A.S. Epton, and D.C. Sigee. 1990. *Erwinia amylovora* infection of hawthorn blossom. *Acta Hort.* 273:207-210.
- XII - G - 155 Smith, A.R.W., R.A. Rastall, R. Wait, N.H. Rees, and R.C. Hignett. 1990. Structure of the extracellular polysaccharide of *Erwinia amylovora*. *Acta Hort.* 273:211-219.
- XII - G - 156 Walters, K., A. Maroofi, E. Hitchin and J. Mansfield. 1990. Determinants of pathogenicity and ability to cause the HR cloned from *Erwinia amylovora*. *Acta Hort.* 273:243-247.
- XII - G - 157 Cooper, R.M., D. Youle, A. Katerinas, and C. Fox. 1990. Host induced virulence in *Erwinia amylovora*. *Acta Hort.* 273:267-274.

- XII - G - 158 Wilson, M., H.A.S. Epton, and D.C. Sigee. 1990. Biological control of fire blight of hawthorn. Acta Hort. 273:363-365.
- XII - G - 159 Garrett, C.M.E. 1990. Strategies for chemical control evaluation. 1990. Acta Hort. 273:395-396.
- XII - G - 160 Nicholson, S., D.C. Sigee, and H.A.S. Epton. 1990. Biological control of fire blight of perry pear: Comparative evaluation of antagonists on immature fruit slices, micropropagated shoots and orchard blossom. Acta Hort. 273:397-403.
- XII - G - 161 Garrett, C.M.E. 1990. Fire blight warning systems: problems and progress. Pp. 26-36 In Proc. Working Group "Integrated Plant Protection in Orchards," Vol. II (C. Gessler, D.J. Butt, and B. Koller Eds.), Brissago, Switzerland.

SWEDEN

- XII - J - 10 Pettersson, M.L. 1990. Horticultural pests and diseases in 1989. Vaxtskyddsnotiser 54:46-49.

NORWAY

- XII - K - 8 Sletten, A. 1990. Fire blight in Norway. Acta Hort. 273:37-40.

GERMANY

- XII - L - 181 Steinbrenner, B. and W. Zeller. 1990. Einfluss von unterschiedlichen Kulturmasnahmen auf die epiphytische Besiedelung von Kernobst durch Erwinia amylovora. Phytomedizin 19(5):39.
- XII - L - 182 Zeller, W. 1990. Test of pome fruit susceptibility to fire blight in the Federal Republic of Germany. Pp 110-115 In "Fire Blight of Pomoideae:" Applied Research in Europe (EUR 12601), Comm. Europ. Commun.
- XII - L - 183 Persiel, F. und W. Zeller. 1990. Resistenzzüchtung gegen Erwinia amylovora (Burr.) Winslow et al., bei Cotoneaster in der Bundesrepublik. Pp 178-181 In "Fire Blight of Pomoideae" Applied Research in Europe (EUR 12601), Comm. Europ. Commun.

- XII - L - 184 Zeller, W. and J. Mosch. 1990. Zur Wirkung von Pflanzenextrakten gegen den Feuerbrand (Erwinia amylovora). Mitt. Biol. Bundesanst. 266:316.
- XII - L - 185 Geider, K. 1990. Der Feuerbrand des Kernobstes: Molekulare Biologie des Erregers Erwinia amylovora. Forum Mikrob. 5:282-295.
- XII - L - 186 Bernhard, F., K. Potter, K. Geider, and D. Coplin. 1990. The *resA* gene from Erwinia amylovora: Identification, nucleotide sequence, and regulation of exopolysaccharide biosynthesis. Molec. Plant-Microbe Interac. 3:429-437.
- XII - L - 187 Steinbrenner, B., H. Lischke, and W. Zeller. 1990. Ein neues Modell zur Feuerbrandprognose. Mitt. Biol. Bundesanst 266:497.
- XII - L - 188 Ficke, W., St. Mäurer. 1990. Methoden und Verfahren der Feuerbrandprognose. Arch. Phytopath. und Pflanzenschutz 26:3-18.
- XII - L - 189 Naumann, K. 1990. Several years old studies on biological control of fire blight. Jahresber. BZA Berlin, Inst. für Phytopath. (Aschersleben) pp. 18-19.
- XII - L - 190 Nachtigall, M., S. Mäurer, and W. Ficket. 1990. A warning system for fire blight on apples: preliminary model and first results. Jahresber. BZA Berlin, Inst. für Phytopath. (Aschersleben) pp. 44-45.
- XII - L - 191 Richter, K., J. Schaefer, and A. Böttger. 1990. Fire blight resistance in fruit trees and ornamental shrubs. Jahresber. BZA Berlin, Inst. für Phytopath. (Aschersleben) pp. 60-61.
- XII - L - 192 Ficke, W., F. Ehrig, M. Nachtigall, K. Naumann, K. Richter, H.J. Schaefer, and R. Zielke. 1990. Possibilities for detecting the causal agent of fire blight (Erwinia amylovora (Burrill) Winslow et al.), in the air space of orchards. Zentralbl. Mikrobiol. 145:121-133.
- XII - L - 193 Ehrig, F. and W. Ficke. 1990. A bacterium collector for use in the field detection of [Erwinia amylovora (Burrill) Winslow et al.]. Arch. Phytopath. und Pflanzenschutz 26:99-101.

- XII - L - 194 Mosch, J. and F. Klingauf. 1989. *In vitro* studies of the efficacy of plant extracts against the fire blight pathogen, *Erwinia amylovora* (Burrill) Winslow et al. Nachricht. Deutsch. Pflanzenschutzd. 41:121-123.
- XII - L - 195 Mosch, J. and W. Zeller. 1989. Control of fire blight (*Erwinia amylovora*) with selected plant extracts. Nachricht. Deutsch. Pflanzenschutzd. 41:149-151.
- XII - L - 196 Fischer, C. and G. Patzold. 1988. 'Pilot' - A variety for prolonged storage suitable for machine harvesting. Gartenbau 35:331-333.
- XII - L - 197 Ehrig, F., W. Ficke, and M. Nachtigall. 1990. Electronmicroscopical studies on the infection process of fire blight. Proc. 7th Intern. Conf. Plant Path. Bact., Abstracts, p. 74.
- XII - L - 198 Gross, M., G. Geier, K. Geider and K. Rudolph. 1990. Levan and levan sucrose form the fire blight pathogen *Erwinia amylovora*. Proc. 7th Intern. Conf. Plant Path. Bact., Part A:81-84.
- XII - L - 199 Zeller, W. and I. Schultz. 1990. Effect of the EPS of *Erwinia amylovora* on the host metabolism of *Cydonia vulgaris*. Proc. 7th Intern. Conf. Plant Path. Bact., Part A:85-92.
- XII - L - 200 Geider, K., H. Falkenstein, P. Bellemann, N. Jahn, T. Schwartz, R. Theiler and F. Bernhard. 1990. Virulence factors of *Erwinia amylovora* influencing development of fire blight symptoms. Proc. 7th Intern. Conf. Plant Path. Bact., Part B:669-673.
- XII - L - 201 Steinbrenner, B. P. Bellemann, W. Zeller und K. Geider. 1990. DNA-Hybridization, a specific method for the diagnosis of fire blight. Acta Hort. 273:91-93.
- XII - L - 202 Abo-El-Dahab, M., M. El-Goorani, and W. Zeller. 1990. Prediction of fire blight disease in Egypt. Acta Hort. 273:115-119.
- XII - L - 203 Geider, K., H. Falkenstein, P. Bellemann, N. Jahn, T. Schwartz, R. Theiler and F. Bernhard. 1990. Virulence factors of *Erwinia amylovora*. Acta Hort. 273:227-231.
- XII - L - 204 Bellemann, P., N. Jahn, R. Theiler, and K. Geider. 1990. Transposon mutagenesis of *Erwinia amylovora*. Acta Hort. 273:233-237.

- XII - L - 205 Persiel, F. and W. Zeller. 1990. Breeding upright growing types of cotoneaster for resistance to fire blight, Erwinia amylovora (Burr.) Winslow et al.. Acta Hort. 273:297-301.
- XII - L - 206 Mosch, J., F. Klingauf, and W. Zeller. 1990. On the effect of plant extracts against fire blight (Erwinia amylovora). Acta Hort. 273:355-361.
- XII - L - 207 Naumann, K. 1990. Mehrjährige untersuchungen zur biologischen bekämpfung des feuerbrandes. Jahresber. Biolog. Zentralanst. (Berlin), Inst. fur Phytopath. (Aschersleben), pp. 18-19.
- XII - L - 208 Richter, K., H.J. Schaefer, A. Boëtger. 1990. Feuerbrandresistenz von obst - und zierhölzen (Fire blight resistance in fruit trees and ornamental shrubs). Jahresber. Biolog. Zentralanst. (Berlin), Inst. fur Phytopath. (Aschersleben), pp. 60.
- XII - L - 209 Mäurer, S. und W. Ficket. 1989. Rechnergestützte Empfehlungenzur Bekämpfung des Feuerbrandes [Erwinia amylovora (Burrill)] Winslow et al. Tag. Ber. Akad. Landwirtsch.-Wiss. DDR, (Berlin) 278:95-100.

AUSTRIA

- XII - N - 12 Keck, M., R. Chartier, W. Zislavsky, and J.P. Paulin. 1990. Thermotherapie von Erwinia amylovora infektionen. Phytomedizin 19(5):39.
- XII - N - 13 Keck, M., R. Chartier, W. Zislavsky, and J.P. Paulin. 1990. First studies on thermotherapy of Erwinia amylovora infections. Pflanzenschutzber. 51:36-39.
- XII - N - 14 Keck, M., R. Chartier, W. Zislavsky, and J.P. Paulin. 1990. Sensitivity of Erwinia amylovora to high temperatures possible use of heat treatment for plant propagation material. Acta Hort. 273:259-266.

SWITZERLAND

- XII - O - 53 Kellerhals, M. 1988. Breeding of pome fruits with stable resistance to diseases. Intern. Organ. Biolog. and Integrated Control of Noxious Animals and Plants, Integrated Control Pome Fruit Diseases Vol. II:116-129.

- XII - O - 54 Grimm, R. and J. Vogelsanger. 1989. First record of fire blight in Switzerland. Schweiz. Zeitsch. Obst. und Weinbau 125:514-516.
- XII - O - 55 Grimm, R. and E. Mani. 1991. Feuerbrand 1990. Schweiz. Zeitsch. Obst- und Weinbau 127:61-64.

POLAND

- XII - P - 29 Podrzucki, W. 1990. Antagonistic bacteria against *Pseudomonas syringae* and *Erwinia amylovora* from wild growing plants. Proc. 7th Intern. Conf. Plant Path. Bact., Part A:193-199.
- XII - P - 30 Sobiczewski, P. and S. Berczynski. 1990. Preliminary evaluation of chemicals efficacy against fire blight. Acta Hort. 273:405-408.

FRANCE

- XII - Q - 172 Lespinasse, Y. 1990. L'amélioration génétique. L'Arbor. Fruit. 434:17-22.
- XII - Q - 173 Le Lezec, M. et J. Babin, Lecomte, P. 1990. Le Feu Bactérien. L'Arbor. Fruit. 434:24-25, 28-30.
- XII - Q - 174 Cadic, A., L. Decourtye, and J.P. Paulin. 1990. Dans nos jardins des *Pyracantha* résistants à la tavelure et au feu bactérien. Jardins de France, 25-27 (Oct).
- XII - Q - 175 Larue, P. and P. Lecomte. 1990. Lutte chimique contre le feu bactérien. Quelques résultats d'essais. L'Action Agric. 25(6):829.
- XII - Q - 176 Paulin, J.P., M. Keck, R. Chartier, and W. Zislavsky. 1990. Trials on the estimation of the fire blight susceptibility by inoculations of immature pome fruits. Pflanzenschutzber. 15:91-98.
- XII - Q - 177 Brisset, M.N., S.J. Ochatt, and J.P. Paulin. 1990. Evidence for quantitative responses during co-culture of *Pyrus communis* protoplasts and *Erwinia amylovora*. Plant Cell Rept. 9:272-275
- XII - Q - 178 Paulin, J.P. and G.F. Rossetto. 1990. Necessite de recherches europeennes sur le feu bacterien. Pp. 2-8 In, "Fire Blight of Pomoideae," Applied Research in Europe (EUR 12601), Comm. Europ. Commun.

- XII - Q - 179 Paulin, J.P. and E. Billing. 1990. Warning systems. Pp. 38-40 In, "Fire Blight of Pomoideae," Applied Research in Europe (EUR 12601), Comm. Europ. Commun.
- XII - Q - 180 Jacquart-Romon, C. and J.P. Paulin. 1990. Estimation des risques dans differentes zones climatiques. Pp 278, In, "Fire Blight of Pomoideae," Applied Research in Europe (EUR 12601), Comm. Europ. Commun.
- XII - Q - 181 Brisset, M.N. 1990. Possibilities offertes par les techniques de culture in vitro dans la recherche de moyens de lutte contre le feu bacterien. Pp. 84-87 In, "Fire Blight of Pomoideae," Applied Research in Europe (EUR 12601), Comm. Europ. Commun.
- XII - Q - 182 Thibault, B. and M. Le Lezec. 1990. Sensibilite au feu bacterien des principales varietes de pommier et de poirier utilisees en Europe. Pp 96-109 In, "Fire Blight of Pomoideae," Applied Research in Europe (EUR 12601), Comm. Europ. Commun.
- XII - Q - 183 Huet, J., J.C. Michelesi. 1990. Sensibilite au feu bacterien des principaux porte-greffe du poirier et du pommier utilises en Europe. Pp 116-118 In, "Fire Blight of Pomoideae," Applied Research in Europe (EUR 12601), Comm. Europ. Commun.
- XII - Q - 184 Paulin, J.P., R. Chartier and J.M. Bore. 1990. Sensibilite au feu bacterien de quelques varietes de pommiers a cidre. Pp 119-121 In, "Fire Blight of Pomoideae," Applied Research in Europe (EUR 12601), Comm. Europ. Commun.
- XII - Q - 185 Thibault, B. 1990. Le programme francais de creation de poirier resistant au feu bacterien. Pp 123-129 In, "Fire Blight of Pomoideae," Applied Research in Europe (EUR 12601), Comm. Europ. Commun.
- XII - Q - 186 Lespinasse, Y. 1990. Le programme francais de creation de pommiers resistants au feu bacterien. Pp 130-135 In, "Fire Blight of Pomoideae," Applied Research in Europe (EUR 12601), Comm. Europ. Commun.
- XII - Q - 187 Cadic., A. and P. Lecomte. 1990. Evaluation de la sensibilite au feu bacterien des Cotoneaster, Pyracantha et Malus en France. Pp 166-177 In, "Fire Blight of Pomoideae," Applied Research in Europe (EUR 12601), Comm. Europ. Commun.

- XII - Q - 188 Cadic, A. and J. Belin. 1990. Le programme francais de creation de *Pyracantha* resistants au feu bacterien. Pp 191-200 In, "Fire Blight of Pomoideae," Applied Research in Europe (EUR 12601), Comm. Europ. Commun.
- XII - Q - 189 Barny, M.A., M.H. Guinebretiere, B. Marcais, E. Coissac, J.P. Paulin, and J. Laurent. 1990. Cloning of a large gene cluster involved in *Erwinia amylovora* CFBP1430. Mol. Microbiol. 4:777-786.
- XII - Q - 190 Vanneste, J.L., J.P. Paulin, and D. Expert. 1990. Bacteriophage mu as a genetic tool to study *Erwinia amylovora* pathogenicity and hypersensitive reaction on tobacco. Journal Bacter. 172:932-941.
- XII - Q - 191 Brisset, M.N., S.J. Ochatt, and J.P. Paulin. 1990. Evidence for quantitative responses during co-culture of *pyrus communis* protoplasts and *Erwinia amylovora*. Plant Cell Rep. 9:272-275.
- XII - Q - 192 Le Lézec, M., A. Belouin. 1990. Sélection variétale du poirier -variétés peu sensibles au feu bacterien - sensibilité du Nashi. L'Action Agric. L'Arboric. de Midi-Pyrénées, Supp. 829, no. 25, (Fevrier) 1 pp.
- XII - Q - 193 Iespinasse, Y., and A. Fouillet. 1990. Apple breeding for resistance to scab, -mildew, fire blight and rosy apple aphid. Colloq. "Integrated Plant Protection in Orchards," Gödöllő, 1-5 Aug.
- XII - Q - 194 Mendoza, H.A. and J.P. Paulin. 1990. Heterogeneity of virulence in natural populations of *Erwinia amylovora*. Proc. 7th Intern. Conf. Plant Path. Bact., Part A: 479-481.
- XII - Q - 195 Barny, M.A., J.P. Paulin, and J. Laurent. 1990. Creation and analysis of mutants of *Erwinia amylovora* altered in pathogenicity. Proc. 7th Intern. Conf. Plant Path. Bact., Part B: 655-667.
- XII - Q - 196 Larue, P. and M. Vincent. 1990. History of fire blight in France 1872-1989 and administrative measures. Acta. Hort. 273:57-65.
- XII - Q - 197 Manceau, C., J.C. Lalande, G. Lachaud, R. Chartier and J.P. Paulin. 1990. Bacterial colonization of flower and leaf surface of pear trees in a commercial orchard. Acta. Hort. 273:73-82.

- XII - Q - 198 Lecomte, P. 1990. Risk of fire blight infection associated with pruning of pear trees. Acta. Hort. 273:83-89.
- XII - Q - 199 Vanneste, J.L. and J.P. Paulin. 1990. Isolation of lytic phages of *E. Amylovora*. Acta. Hort. 273:95-98.
- XII - Q - 200 Jacouart-Romon, C. and J.P. Paulin. 1990. Preliminary experimentation of a computerized warning system for the control of fire blight. Acta. Hort. 273:131-137.
- XII - Q - 201 Lemaire, F., C. Couvreur, J.P. Paulin and A. Cadic. 1990. Influence of calcium and potassium nutrition on fire blight susceptibility. Acta. Hort. 273:189-194.
- XII - Q - 202 Brisset, M.N. and J.P. Paulin. 1990. Study of the interaction between *E. amylovora* and plant tissue through measure of electrolyte leakages. Acta. Hort. 273:197-205.
- XII - Q - 203 Barny, M.A., J.P. Paulin, and J. Laurent. 1990. Isolation of avirulent mutants of *Erwinia amylovora* CFBP1430. Acta. Hort. 273:242.
- XII - Q - 204 Vanneste, J.L. and D. Expert. 1990. Detection and characterization of an iron uptake system in *E. Amylovora*. Acta. Hort. 273:249-253.
- XII - Q - 205 Mendoza, A. and J.P. Paulin. 1990. Possible role of naturally occurring non-aggressive isolates of *Erwinia amylovora* in the epidemiology of fire blight. Acta. Hort. 273:254.
- XII - Q - 206 Lespinasse, Y. and J.P. Paulin. 1990. Apple breeding programme for fire blight resistance; strategy used and first results. Acta. Hort. 273:285-295.
- XII - Q - 207 Cadic, A., J. Belin, and J.P. Paulin. 1990. New pyracanthas resistant to scab [*Spilocaea pyracanthae* (Ooth.) Rostrup] and to fire blight [*Erwinia amylovora* (Burr.) Winsl. et al.] Acta. Hort. 273:303-309.
- XII - Q - 208 Paulin, J.P. and Y. Lespinasse. 1990. Pathogenicity of strains of *Erwinia amylovora* to some apple cultivars in the greenhouse. Acta. Hort. 273:319-326.

- XII - Q - 209 Paulin, J.P., R. Chartier, M.N. Brisset, P. Lecomte, G. Lachaud, and P. Larue. 1990. Experiments with fosetyl aluminium (Aliette) in fire blight control. Acta. Hort. 273:383-389.
- XII - Q - 210 Vanneste, J.L. and J. Yu. 1990. Control of fire blight by Erwinia herbicola EH 252 in an experimental orchard in Dax (Southwest of France). Acta. Hort. 273:409-410.
- XII - Q - 211 Brisset, M.N., R. Chartier, J.P. Paulin, and R. Chevalier. 1990. Experimentations with "Friestop" 3M in the chemical control of fire blight. Acta. Hort. 273:413-418.
- XII - Q - 212 Lecomte, P. and J.P. Paulin. 1991. Transmission du feu bactérien par la taille en verger. Fruits et Légumes 82:20-23.
- XII - Q - 213 Lecomte, P. and J.P. Paulin. 1991. La taille et le feu bactérien. L'Arbor. Fruit. No. 45, 5 pp.

BELGIUM

- XII - R - 80 Deckers, T. and Ph. Maertens. 1990. Formation and viability of strands of Erwinia amylovora. Med. Fac. Landouww. Rijksuniv. Gent., 55:1113-1118.
- XII - R - 81 Hutschemackers, J., H. Bazin, F. Snacken, and M. Verhoyen. 1990. Utilisation of rat monoclonal antibodies to detect Erwinia amylovora. Acta. Hort. 273:43-50.
- XII - R - 82 De Wael, L., M. De Greef, and O. Van Laere. 1990. The honeybee as a possible vector of (Burr.) Winslow et al. Acta. Hort. 273:107-113.
- XII - R - 83 Timmermans, Y. 1990. A warning system for fire blight on pears in Belgium: Preliminary model and practical prospects. Acta Hort. 273:121-129.
- XII - R - 84 Viseur, J. 1990. Evaluation of fire blight resistance of somaclonal variants induced from the pear cultivar "Durondeau". Acta. Hort. 273:275-284.
- XII - R - 85 Deckers, T., W. Porreyne, and P. Maertens. 1990. Three years of experience in chemical control of fire blight in pear orchards in Belgium. Acta. Hort. 273:367-376.

ITALY

- XII - T - 42 Bagnara, G.L., L. Rivalta, and R. Quarta. 1990. Estimation of stability for fire blight resistance in pear. 23rd Intern. Hort. Congr. (Florence), Abst. 1084, Vol. 1:40.
- XII - T - 43 Bazzi, C., U. Mazzucchi, E. Stefani, A. Calzolari, C. Dal Col, E. Credpdi, A. Saccardi, V. Scapini, O. Zafarana, C. Biraghi, C. Frausin, C. Spessotto, M. Braidot, G. Zujani, F. Giuseppe, P.L. Carniel, R. Edalucci, G. Sepulcri, M. Babici, and R. Fracalossi. 1990. Non C'E «« colpo di fuoco »» batterico nelle regioni veneto e friuli-venezia giulia. L'Inform. Agrar. 46(21):84-87.
- XII - T - 44 Laccone, G. 1990. Il ««Colpo Di Fuoco»» Batterico È ««entrato»» In Italia. L'Informatore Agrario 46(35):97-99.
- XII - T - 45 Cariddi, C. 1990. Colpo di fuoco sul pero. *L'Erwinia amylovora* non deve costituire motivo di gravissima apprensione. Terra. E Vita No. 34:67-69.

SPAIN

- XII - U - 11 Montesinos, E. and P. Vilardell. 1989. On the role of *seuodomonas syringae* pv. *syringae* in blast of pear trees in catalunya, Spain. Acta. Hort. 256:143-149.

CZECHOSLOVAKIA

- XII - V - 6 Kudela, V. 1990. Spála růžovitých rostlin (Fire blight of rosaceons plants). Minist. zemědělství a výživy ČR, Výstavnictví zemědělství a výživy České Budějovice, 163 pp.
- XII - V - 7 Kudela, V. 1990. The fire blight situation in Czechoslovakia in 1986-1988. Fifth Intern. Workshop on Fire Blight, Abstr.

YUGOSLAVIA

- XII - W - 6 European and Mediterranean Plant Protection Organization. 1991. *Erwinia amylovora* present in Yugoslavia. Europ. and Medit. Plant Prot. Organ. Rept. 509:14.

- XII - W - 7 M. Arsenijevic. 1989. *Erwinia amylovora* (Burill 1982) Winslow et al., 1920 - The danger is coming. Proc. Contemp. Apple and Pear Prod. in Serbia. Subotica, 24-25 8:100-107.
- XII - W - 8 Arsenijevic, M. 1989. Nove pojave i rasprostranjenost bakterije *Erwinia amylovora* U evoropi danas. Glasnik zaštite bilja 6:242-244.
- XII - W - 9 Panić, M. and M. Arsenijević. 1991. Some new actual data concerning *Erwinia amylovora* in Yugoslavia and abroad. XV Workshop on Plant Protection in Serbia (Yugoslavia). Abstracts of papers, pp. 26-27.

USSR

- XIII - A - 39 Plant Protection Service (USSR). 1990. Fire blight in Armenian SSR. EPPO Reporting Ser. No. 506:08.

TURKEY

- XIII - B - 5 Momol, M.T., O. Yegen, H. Basim, M.A. Zachowski, and K. Rudolph. 1990. Observation and identification of fire blight on pear in the south-west of Turkey. "Arbeitskreis Phytobakteriologie" Munster, West-Germany, Abst.

ISRAEL

- XIII - C - 11 Shabi, E. and D. Zutra. 1990. Five years of fire blight in Israel. Acta. Hort. 273:41.

EGYPT

- XIII - E - 18 El-Goorani, M.A., H.M. El-Kasheir, A.A. Shoeib, and F.M. Hassanein. 1989. Distribution of streptomycin resistant strains of *Erwinia amylovora* in Egypt during 1988. J. Phytopathology 127:69-74.
- XIII - E - 19 Seif El-Nasr, H.I. 1990. Development of fire blight epidermis on pear in norhtern of Egypt during 1984 up to 1988. Proc. 7th Intern. Conf. Plant Path. Bact., Abst. p.78.

- XIII - E - 20 Abo-El-Dahab, M.K, M.A. El-Goorani, W. Zeller, and A.A. Shoeib. 1990. Plasmid detection in isolates of *Erwinia amylovora* in Egypt. Proc. 7th Intern. Conf. Plant Path. Bact., Abst. p. 117.
- XIII - E - 21 El-Nasy, S., I. Hamdy, and M.H. Ali. 1990. Fire blight incidence in pear orchards and its control in Egypt. Acta. Hort. 273:392.

MEXICO

- XIII - L - 7 Lopez, C. and L. Fucikovsky. 1990. Distribution of fire blight in Mexico and the identification of the bacteria on pear and pyracantha. Acta. Hort. 273:33-36.

GREECE

- XIII - V- 10 Psallidas, P.G., D.A. Retalis, and J. Tsiantos. 1990. Climatic data and fire blight occurrence in Greece. Proc. 7th Intern Conf. Plant Path. Bact., Part A: 285-290.
- XIII - V - 11 Psallidas, P.G. and D.A. Retalis. 1990. Fire blight on pomaceous trees in Greece - Evolution of the disease and characteristics of the pathogen *Erwinia amylovora*. Acta. Hort. 273:25-32.

CYPRUS

- XIII - W - 5 Dimova-Aziz, M. 1990. Chemical control of fire blight blossom infection under field conditions in Cyprus. Acta. Hort. 273:377-382.

EARLY BLOSSOM PERIOD



The Blighters indulge in an orgy of drinking

OGNEN PRIGOR



Fire blight of pear and quince in Bulgaria

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1. Actively engaged in fire blight research;
2. Indirectly interested in fire blight;
3. Interested in fire blight, but located in region where disease is not present;
4. Retired but still interested in fire blight activities.

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For FAX numbers, area or regional code was not repeated.

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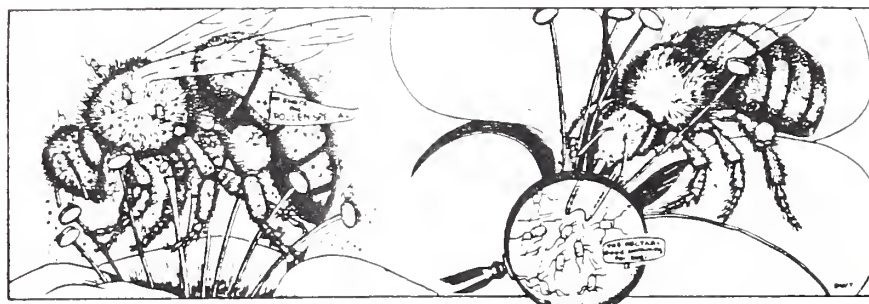
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Canada	1	Israel	972	South Africa	27
Chili	56	Italy	39	Spain	34
Cyprus	357	Japan	81	Sweden	46
Czechoslovakia	42	Luxemburg	352	Switzerland	41
Denmark	45	Mexico	52	Turkey	90
Egypt	20	Morocco	212	United States	1
England	44	Netherlands	31	USSR	7
France	33	New Zealand	64	Yugoslavia	38



Insects carry the Blighters from diseased to healthy blossoms

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SUMMARY

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SUMMARY

PERSONS INTERESTED IN FIRE BLIGHT

Country	Interest Category				Total	Number of Contact Persons
	1	2	3	4		
* USA - United States	29	31			60	20
* CND - Canada	4	13			17	6
* BRD - Germany	12	6			18	2
* UK - England	8	8		2	18	1
* FR - France	5	5			10	1
* BLG - Belgium	6	3			9	1
* NL - Netherlands	6	2			8	1
* ITA - Italy	2	5			7	1
* TUR - Turkey	5	1			6	1
* YUG - Yugoslavia	1	5			6	1
* MEX - Mexico	3	1			4	1
* SWT - Switzerland	1	3			4	1
* GRC - Greece	1	3			4	1
* EGY - Egypt	1	3			4	1
* CZE - Czechoslovakia	1	2			3	1
* DK - Denmark		3			3	1
* BUL - Bulgaria		2			2	1
* SWD - Sweden	1	1			2	1
* POL - Poland	1	1			2	1
* CYP - Cyprus	1	1			2	1
* NZ - New Zealand	1	1			2	1
* NOR - Norway		2			2	1
* ISR - Israel	1				1	1
* IRL - Ireland		1			1	1
* LEB - Lebanon		1			1	1
SPN - Spain			5		5	1
AUS - Australia			5		5	1
ROM - Romania			3		3	1
POR - Portugal			3		3	1
JAP - Japan			3		3	1
HUN - Hungary			2		2	1
ARG - Argentina			2		2	1
CHI - China			2		2	1
CHL - Chili			2		2	1
MOR - Morocco			2		2	1
IND - India			2		2	1
OST - Austria			1		1	1
SA - South Africa			1		1	1
USR - USSR			1		1	1
TAW - Taiwan			1		1	1
ALG - Algeria			1		1	1
TOTAL	92	102	36	2	232	66

* Countries with fire blight.

